College Algebra Name: KEY

6.4 - Solving Trig Equations Using Identities Day 1 Date: _____ Period: _____

Solve the following equations over the interval $[0°, 360°)$.

1.) $\sin^2 x = 2 - 5\cos^2 x$

$1 - \cos^2 x = 2 - 5\cos^2 x$

$4\cos^2 x = 1$

$\sqrt{\cos^2 x} = \sqrt{1/4}$

$\cos x = \pm 1/2$

Solution(s): $60°, 120°, 240°, 300°$

2.) $\tan x = 3\cot x$

$\frac{\tan x}{1} = \frac{3}{\tan x}$

$\sqrt{\tan^2 x} = \sqrt{3}$

$\tan x = \pm\sqrt{3}$

Solution(s): $60°, 120°, 240°, 300°$

3.) $2\sin x - \csc x = 0$

$2\sin x = \csc x$

$\frac{2\sin x}{1} = \frac{1}{\sin x}$

$2\sin^2 x = 1$

$\sqrt{\sin^2 x} = \sqrt{1/2}$

$\sin x = \pm\frac{\sqrt{2}}{2}$

Solution(s): $45°, 135°, 225°, 315°$

4.) $2\sec^2 x + \tan^2 x = 3$

$2(1 + \tan^2 x) + \tan^2 x = 3$

$2 + 2\tan^2 x + \tan^2 x = 3$

$3\tan^2 x = 1$

$\sqrt{\tan^2 x} = \sqrt{1/3}$

$\tan x = \pm\sqrt{3}/3$

Solution(s): $30°, 150°, 210°, 330°$

Solve the following equations over the interval $[0, 2\pi)$.

5.) $2\cos^2 x + 3\sin x - 3 = 0$

$2(1-\sin^2 x)+3\sin x-3=0$

$2-2\sin^2 x+3\sin x-3=0$

$-2\sin^2 x+3\sin x-1=0$

$2\sin^2 x-3\sin x+1=0$

$(2\sin x-1)(\sin x-1)=0$

$\sin x=1/2 \quad \sin x=1$

Solution(s): $\pi/6, 5\pi/6, \pi/2$

6.) $\sin^2 x - \cos^2 x = 1$

$1-\cos^2 x-\cos^2 x=1$

$-2\cos^2 x=0$

$\sqrt{\cos^2 x}=\sqrt{0}$

$\cos x=0$

Solution(s): $\pi/2, 3\pi/2$

7.) $\cot x = 2\cos x$

$\frac{\cos x}{\sin x}=\frac{2\cos x}{1}$

$2\cos x\sin x=\cos x$

$2\cos x\sin x-\cos x=0$

$\cos x(2\sin x-1)=0$

$\cos x=0 \quad \sin x=1/2$

Solution(s): $\pi/2, 3\pi/2, \pi/6, 5\pi/6$

8.) $\cos x + \sin x \cot x = 2$

$\cos x+\frac{\sin x}{1}\cdot\frac{\cos x}{\sin x}=2$

$\cos x+\cos x=2$

$2\cos x=2$

$\cos x=1$

Solution(s): 0